eurofins | Lancaster Laboratories Environmental

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Integral Consulting Inc.
Suite 190
285 Century Place
Louisville CO 80027

Report Date: March 01, 2017

Project: Solvay

Submittal Date: 02/01/2017
Group Number: 1760921
State of Sample Origin: NJ

Client Sample Description	Lancaster Labs (LL) #
V-915 Grab Water	8815814
Field Blank Grab Water	8815815

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To	Solvay	Attn: Mitch Gertz
Electronic Copy To	Solvay	Attn: Mark Christensen
Electronic Copy To	Integral Consulting Inc.	Attn: Erin Palko
Electronic Copy To	Integral Consulting Inc.	Attn: Craig Hutchings

Respectfully Submitted,

(717) 556-7236

Sample Description: V-915 Grab Water
Solvay

LL Sample # WW 8815814
LL Group # 1760921
Account # 20003

Project Name: Solvay

Collected: 01/31/2017 08:00 by MC

Submitted: 02/01/2017 10:00
Reported: 03/01/2017 12:46

Integral Consulting Inc.
Suite 190
285 Century Place
Louisville CO 80027

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	**EPA 537 Rev 1.1**		**ng/l**		**ng/l**	**ng/l**	
10954	Perfluorooctanoic acid	335-67-1	550	B	0.6	2	1
10954	Perfluorononanoic acid	375-95-1	4,200	B	6	20	10
10954	Perfluorodecanoic acid	335-76-2	43	B	0.5	2	1
10954	Perfluoroundecanoic acid	2058-94-8	150		1	3	1
10954	Perfluorododecanoic acid	307-55-1	2	J	0.5	2	1
10954	Perfluorotridecanoic acid	72629-94-8	2	J	0.5	2	1
10954	Perfluorotetradecanoic acid	376-06-7	0.6	J	0.5	2	1
10954	Perfluorohexanoic acid	307-24-4	180	B	0.6	2	1
10954	Perfluoroheptanoic acid	375-85-9	78	B	0.5	2	1
10954	Perfluorobutanesulfonate	375-73-5	4	B	0.8	3	1
10954	Perfluorohexanesulfonate	355-46-4	11	B	1	3	1
10954	Perfluoro-octanesulfonate	1763-23-1	53	B	2	6	1

Target analytes were detected in the method blank associated with the samples as noted on the QC Summary. The following corrective action was taken: The sample was reextracted outside the holding time and no reportable hits were detected in the method blank. Comparable data was observed between the two extractions with the following exceptions:
Perfluorohexanoic acid: 18 ng/l in the re-extraction
Perfluorooctanasulfonate: 7 ng/l in the re-extraction

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFAS in Water by LC/MS/MS	EPA 537 Rev 1.1	1	17038011	02/23/2017 16:25	Jason W Knight	1
10954	PFAS in Water by LC/MS/MS	EPA 537 Rev 1.1	1	17038011	02/24/2017 20:29	Jason W Knight	10
14091	PFAA Water Prep	EPA 537 Rev 1.1	1	17038011	02/08/2017 12:40	Devon M Whooley	1

*=This limit was used in the evaluation of the final result

Sample Description: Field Blank Grab Water
Solvay

LL Sample # WW 8815815
LL Group # 1760921
Account # 20003

Project Name: Solvay

Collected: 01/31/2017 08:00 by MC

Submitted: 02/01/2017 10:00
Reported: 03/01/2017 12:46

Integral Consulting Inc.
Suite 190
285 Century Place
Louisville CO 80027

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	**EPA 537 Rev 1.1**		**ng/l**		**ng/l**	**ng/l**	
10954	Perfluorooctanoic acid	335-67-1	1	JB	0.6	2	1
10954	Perfluorononanoic acid	375-95-1	0.7	JB	0.6	2	1
10954	Perfluorodecanoic acid	335-76-2	0.9	JB	0.5	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.		1	3	1
10954	Perfluorododecanoic acid	307-55-1	N.D.		0.5	2	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.		0.5	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.		0.5	2	1
10954	Perfluorohexanoic acid	307-24-4	3	B	0.6	2	1
10954	Perfluoroheptanoic acid	375-85-9	1	JB	0.5	2	1
10954	Perfluorobutanesulfonate	375-73-5	1	JB	0.8	3	1
10954	Perfluorohexanesulfonate	355-46-4	2	JB	1	3	1
10954	Perfluoro-octanesulfonate	1763-23-1	16	B	2	6	1

Target analytes were detected in the method blank associated with the samples as noted on the QC Summary. The following corrective action was taken: The sample was reextracted outside the holding time and no reportable hits were detected in the method blank. Comparable data was observed between the two extractions with the following exceptions:
Perfluorohexanoic acid: 0.8 J ng/l in the re-extraction
Perfluorooctanasulfonate: 7 ng/l in the re-extraction

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFAS in Water by LC/MS/MS	EPA 537 Rev 1.1	1	17038011	02/23/2017 18:07	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev 1.1	1	17038011	02/08/2017 12:40	Devon M Whooley	1

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1760921
Reported: 03/01/2017 12:46

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result ng/l		MDL** ng/l	LOQ ng/l
Batch number: 17038011	Sample number(s): 8815814-8815815			
Perfluorooctanoic acid	5		0.6	2
Perfluorononanoic acid	0.6	J	0.6	2
Perfluorodecanoic acid	1	J	0.5	2
Perfluoroundecanoic acid	N.D.		1	3
Perfluorododecanoic acid	N.D.		0.5	2
Perfluorotridecanoic acid	N.D.		0.5	2
Perfluorotetradecanoic acid	N.D.		0.5	2
Perfluorohexanoic acid	31		0.6	2
Perfluoroheptanoic acid	10		0.5	2
Perfluorobutanesulfonate	1	J	0.8	3
Perfluorohexanesulfonate	1	J	1	3
Perfluoro-octanesulfonate	4	J	2	6

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 17038011	Sample number(s): 8815814-8815815								
Perfluorooctanoic acid	200	171.4	200	180.49	86	90	70-130	5	30
Perfluorononanoic acid	200	173.55	200	180.44	87	90	70-130	4	30
Perfluorodecanoic acid	200	187.82	200	192.69	94	96	70-130	3	30
Perfluoroundecanoic acid	200	160.3	200	164.53	80	82	70-130	3	30
Perfluorododecanoic acid	200	160.52	200	168.58	80	84	70-130	5	30
Perfluorotridecanoic acid	200	178.04	200	175.46	89	88	70-130	1	30
Perfluorotetradecanoic acid	200	169.59	200	173.58	85	87	70-130	2	30
Perfluorohexanoic acid	200	156.69	200	178.83	78	89	70-130	13	30
Perfluoroheptanoic acid	200	177.57	200	180.42	89	90	70-130	2	30
Perfluorobutanesulfonate	176.8	140.83	176.8	154.55	80	87	70-130	9	30
Perfluorohexanesulfonate	189.2	158.87	189.2	169.08	84	89	70-130	6	30
Perfluoro-octanesulfonate	191.2	162.68	191.2	162.96	85	85	70-130	0	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1760921
Reported: 03/01/2017 12:46

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ng/l	MS Spike Added ng/l	MS Conc ng/l	MSD Spike Added ng/l	MSD Conc ng/l	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 17038011	Sample number(s): 8815814-8815815 UNSPK: 8815814									
Perfluorooctanoic acid	546.79	199.8	711.59			82		70-130		
Perfluorononanoic acid	4217.27	199.8	5142.1			463 (2)		70-130		
Perfluorodecanoic acid	42.69	199.8	223.25			90		70-130		
Perfluoroundecanoic acid	146.84	199.8	298.18			76		70-130		
Perfluorododecanoic acid	1.67	199.8	190.94			95		70-130		
Perfluorotridecanoic acid	1.83	199.8	227.4			113		70-130		
Perfluorotetradecanoic acid	0.622	199.8	178.86			89		70-130		
Perfluorohexanoic acid	180.41	199.8	226.78			23*		70-130		
Perfluoroheptanoic acid	77.62	199.8	232.93			78		70-130		
Perfluorobutanesulfonate	4.33	176.62	173.09			96		70-130		
Perfluorohexanesulfonate	11.11	189.01	199.57			100		70-130		
Perfluoro-octanesulfonate	52.59	191.01	230.09			93		70-130		

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 17038011

	13C4-PFBA	13C5-PFPeA	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA
8815814	71	97	118	73	88	83
8815815	60*	66*	75	79	78	81
Blank	67*	78	77	69*	74	66*
LCS	72	82	90	74	72	69*
LCSD	81	87	102	79	77	76
MS	69*	89	104	65*	59*	67*
Limits:	70-130	70-130	70-130	70-130	70-130	70-130

	13C8-PFOA	13C8-PFOS	13C9-PFNA	13C6-PFDA	d3-NMeFOSAA	13C7-PFUnDA
8815814	85	86	56*	84	58*	79
8815815	77	61*	77	69*	68*	82
Blank	76	75	83	70	64*	83
LCS	72	73	86	71	58*	74
LCSD	76	86	86	83	67*	86
MS	64*	71	53*	72	50*	69*
Limits:	70-130	70-130	70-130	70-130	70-130	70-130

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1760921
Reported: 03/01/2017 12:46

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 17038011

	d5-NEtFOSAA	13C2-PFDoDA	13C2-PFTeDA
8815814	67*	91	94
8815815	77	72	88
Blank	66*	76	73
LCS	69*	73	79
LCSD	69*	84	89
MS	55*	70	85
Limits:	70-130	70-130	70-130

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # 20003 Group # 1760921 Sample # 8815814-15

COC # 519394

Client Information

Client: Solvay

Acct. #:

Project Name/#:

PWSID #:

Project Manager:

P.O. #:

Sampler: Mark Christensen

Quote #:

State where samples were collected: NJ

For Compliance: Yes ☑ No ☐

Matrix

Soil ☐ Sediment ☐ Tissue ☐

Water: Potable ☐ Ground ☐ NPDES ☐ Surface ☒

Other: ☐

Analysis Requested

Preservation Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	PFAA
V-915	11/31/17	0800	X		2	X
Field Blank	11/31/17	0800	X		1	X

For Lab Use Only

FSC:

SCR#: 200526

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks

Trizma

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: 2/20/17

E-mail address: mark.christensen@solvay.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP)
Type VI (Raw Data Only)
Type III (Reduced non-CLP)
NJ DKQP
TX TRRP-13
NYSDEC Category A or B
MA MCP
CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Bottle Storage	11/19/17	9:00		11/19/17	9:00
	11/19/17	13:25		11/22/17	0900
	11/31/17	1500			
			Rachita	12/1/17	10:00

EDD Required? Yes (No)

If yes, format:

Site-Specific QC (MS/MSD/Dup)? Yes (No)

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ✓ Other ____

Temperature upon receipt 2.8 °C

eurofins | Lancaster Laboratories Environmental

Sample Administration Receipt Documentation Log

Doc Log ID: 174499

Group Number(s): 1760921

Client: Solvay

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	02/01/2017 10:00
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	NJ		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Carolyn Cyms (964) at 14:57 on 02/01/2017

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT146	2.8	DT	Wet	Y	Bagged	N

2425 New Holland Pike
Lancaster, PA 17605-2425
T 717-656-2300
F 717-656-2681
www.LancasterLabs.com

eurofins | Lancaster Laboratories Environmental

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mg**	milligram(s)
C	degrees Celsius	**mL**	milliliter(s)
cfu	colony forming units	**MPN**	Most Probable Number
CP Units	cobalt-chloroplatinate units	**N.D.**	none detected
F	degrees Fahrenheit	**ng**	nanogram(s)
g	gram(s)	**NTU**	nephelometric turbidity units
IU	International Units	**pg/L**	picogram/liter
kg	kilogram(s)	**RL**	Reporting Limit
L	liter(s)	**TNTC**	Too Numerous To Count
lb.	pound(s)	**µg**	microgram(s)
m3	cubic meter(s)	**µL**	microliter(s)
meq	milliequivalents	**umhos/cm**	micromhos/cm

< less than

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference…
W - The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.